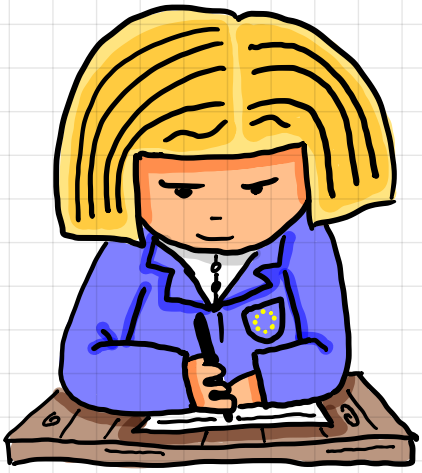


Specific heat capacity

1. Calculate the amount of energy stored in or released from a system as the temperature changes.

Specific heat capacity

To calculate the amount of energy stored in hot water, scientists use specific heat capacity.

The specific heat capacity of a substance is the amount of energy required the raise the temperature of 1 kg of the substance by 1 °C

The equation to calculate change in thermal energy

θ means temperature

Change in thermal energy = mass x specific heat capacity x temperature change

joules (J) | kilograms (kg) | joules/kilograms celsius | celsius

or $\Delta E = m \times c \times \Delta\theta$

Δ means change

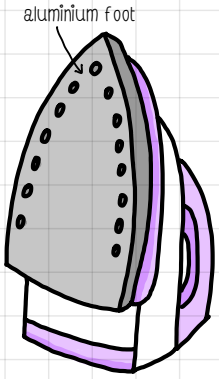
You DO NOT need to learn this equation for the exam

Calculating change in thermal energy

Calculate the energy required to increase the temperature of 2 kg of water from 20 °C to 100 °C. The specific heat capacity of water is 4200 J/Kg °C.

1. Calculate the change in temperature : 100 - 20 = 80
2. Use the equation $\Delta E = m \times c \times \Delta\theta$
3. Substitute the values into the equation. $\Delta E = 2 \times 4200 \times 80$
4. $\Delta E = 672000$ J (or 672kJ)

Practice question #1

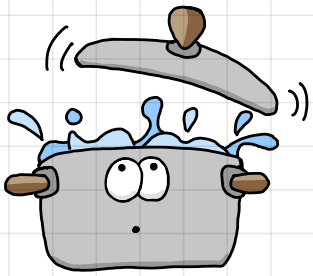


An iron has an aluminium foot with a mass of 2kg. Calculate the energy stored in the foot when the temperature rises from 20 °C to 180 °C. The specific heat capacity of aluminium is 913 J/kg °C.

1. Calculate the change in temperature : 180 - 20 = 160
2. Use the equation $\Delta E = m \times c \times \Delta\theta$
3. Substitute the values into the equation. $\Delta E = 2 \times 913 \times 160$
4. $\Delta E = 292160$ J (or 292 kJ)

Specific heat capacity...

Practice question #2



A saucepan cools down from 80 C to 20 C releasing 650000 J of thermal energy. Calculate the mass of the water in the saucepan. The specific heat capacity of water is 4200 J/kg C.

1. Calculate the change in temperature : 80 - 20 = 60
2. Use the equation $\Delta E = m \times c \times \Delta\theta$
3. Substitute the values into the equation. $650000 = m \times 4200 \times 60$
4. Simplify the equation. $650000 = 252000m$
5. To calculate m, divide the number on the left by the number on the right.

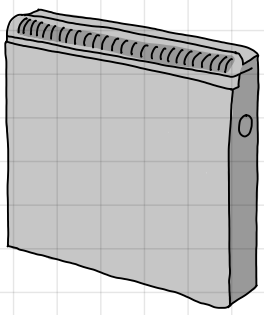
   $m = 650000 \div 252000$
6. $m = 2.58$ kg

Practice question #3

A storage heater contains 20kg. 400000 J of energy is transferred to heat up the 15 C to 40 C. Calculate the specific heat capacity of concrete.

1. Calculate the change in temperature : 40 - 15 = 25
2. Use the equation $\Delta E = m \times c \times \Delta\theta$
3. Substitute the values into the equation. $400000 = 20 \times c \times 25$
4. Simplify the equation. $400000 = 500c$
5. To calculate c, divide the number on the left by the number on the right.

   $c = 400000 \div 500$
6. $c = 800$ J/kg°C



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